Reducing the Research to Practice Gap (R2PG) with Faculty Team Collaborations



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For more information on OLSUME: <u>https://olsume.org/</u>













Presenter's Background

Sheila Tabanli is a mother, a wife, and an educator.

K-12 Ed Setting

- National Blue Ribbon K-12 suburb school
 - Various roles related to student, parent, and faculty affairs
- Urban high school
 - Restructured the math dept. that resulted in students' math growth and math teacher retention

Higher Ed Setting

- Designed an innovative math curriculum to reduce math achievement gap (<u>Math 125</u>)
- Faculty Support Group Facilitator (<u>Reducing</u> <u>Research 2 Practice Gap in Teaching (RR2PG)</u>)
- Grant Awardee:
 - Tyler Clementi Center for Diversity Education and Bias Prevention fellowship, <u>Reducing the</u> <u>novice-expert perception gap to increase</u> <u>diversity in STEM</u>". (20
 - Rutgers Equity and Inclusion faculty collaboration grant, <u>FAN into STEM (Faculty</u> <u>Affinity Network)</u>, 23-2024)



Gaps in Math Teaching & Learning

- Math Readiness Gap
- Math Achievement Gap
- Pandemic Learning Gap
- Research-to-Practice Gap / Faculty Collaboration Gap
- Novice-to-Expert Perception Gap
- Novice Perception Gap about Effective Math Learning & Studying

Seminar Objectives

R2PG	Framework	Faculty Teams	DEI
Reducing the gap between research on student learning and the higher-ed teaching practices (R2PG)	Developing "Learning Bits" grounded on a proposed instructional framework as no/low stakes assessments.	Fostering student- centered teaching practices through faculty team collaborations	Offering equitable math learning opportunities

Math 125 (An innovative, hybrid, interdisciplinary course)





Cognitive Science Research

SEL



Personalized Pathways ACTIVE MIND Challenge Resilience Accuracy ACTIVE IDENTITY Responsibility Individuality Responsibility Responsibility Individuality Responsibility Responsibi

> Active Learning





Pólya's Framework for Mathematical Problem Solving

- Problem-solving plays an important role in mathematics (and in life).
- According to NCTM(National Council of Teachers of Mathematics), the term "problem solving" refers to mathematical tasks that have the potential to provide intellectual challenges for enhancing students' mathematical understanding and development.
- The importance of metacognition in mathematical problem solving is evident.

https://student.desmos.com/join/dfazbn

OLSUME Faculty Activity (6 minutes)

Go to student.desmos.com and type in:



OLSUME Faculty Activity Key

Table 4. Utility Assessment and Ratings of Generalizability for Each of the Learning Techniques

Utility
Moderate
Moderate
Low
High
High
Moderate

 Adopted from: Dunlosky J, Rawson KA, Marsh EJ, Nathan MJ, Willingham DT. Improving Students' Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology. Psychol Sci Public Interest. 2013 Jan;14(1):4-58. doi: 10.1177/1529100612453266. PMID: 26173288.

OLSUME Faculty Activity Key

Table 4. Utility Assessment and Ratings of Generalizability for Each of the Learning Techniques

	Technique	Utility
	Elaborative interrogation	Moderate
•	Self-explanation	Moderate
	Summarization	Low
	Highlighting	Low
	The keyword mnemonic	Low
	Imagery use for text learning	Low
$\Box >$	Rereading	Low
•	Practice testing	High
	Distributed practice	High
	Interleaved practice	Moderate

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Framework for Incorporating Cognitive Science & SEL Principles Into Instruction*

* Manuscript in writing

Prior to Class

- Priming Effect.
- Retrieval Practice.

During Class

- Retrieval Practice.
- Dual coding.
- Chunking.
- Elaborative Interrogation.

After Class

- Retrieval Practice.
- Pomodoro.
- Spaced Repetition.
- Interleaving.

Social Emotional Learning (SEL)

Learning Bits - Calculus I Instruction

- 5 minute announcements/reminders (sleep, cellphones, resources etc)
- Retrieval practice as breaks during instruction
- Re-visit students' why
- Chunking the procedures
- Dual coding (algebraic solutions and visuals)
- Spaced repetition and interleaving assignments

Faculty Team Collaborations

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Faculty Team

- Proposed the group in 2022 to Rutgers TEN leadership team
- Advertised by multiple units at Rutgers ٠
- First group met in Spring 2023 (multi-disciplinary) ٠
- Second group will meet in Fall 2023 (multi-campuses) ٠
- Designed a Canvas site ٠
 - Bi-monthly meetings
 - Design Memo, Reading Tasks, Activities •
 - SMART Goal/Peer Accountability
 - Classroom Visits/Peer Observations Reports
 - Teaching Portfolio
 - Faculty Sense of Belonging
 - Team Grants, Collaborations

TEN SSG - Fall 2023 RR2PG Group > Modules

Home

Home	
Modules	
Assignments	
Zoom	 Resources for Meetings
Discussions	······································
People	Group Goals & Meeting Schedule
Pages	Proposed Instructional Framework
Files	
Kaltura Course Gallery	SIMPLE Design Memo Framework & Expectations
Student Instructional Rating Survey	
	 Mtg1 (Wed, Sept27, 10:30-11:30am): Grant Surveys, Group Goals, Initial Readings
	<u>Meeting Agenda</u>
	Tasks
	TEN SSG Survey Links (please complete!)
	SIMPLE Design Memo Framework & Expectations
	Proposed Instructional Framework
	Reading Task (Due Oct 4th)
	Improving Students' Learning With Effective Learning Techniques - 2013.pdf

From Faculty Team Participants



From Faculty Team Participants



Lyra - Psychology

•I introduced small group discussions in my psychology classes, which typically have between 250 to 350 students. To prepare for these discussions, I ask students to individually annotate a case study before the class session, ensuring everyone has a role in the assignment. During the group meetings, they collaborate to address the provided prompts. Prior to commencing these discussions, all participants draft a collective course agreement, confirming their commitment to adhering to group rules. Additionally, there's a mechanism in place for anonymously reporting any instances of a group member failing to contribute. This semester, a Ph.D. student is researching the outcomes of implementing small group discussions within a large lecture course for her doctoral thesis.



Laurent - Math

• Retrieval practice activity at the beginning of each lecture. The activity was typically a small exercise requiring students to retrieve and use material from previous lectures. Students work on the exercise on their own for about 5 minutes. Then, open discussion with the class to debrief and solve the exercise I explicitly explained the strategy to students, the reason for implementing it and its goals. • Ahead of each exam, I also discussed effective learning strategies for students to use as they study (retrieval practice and self-testing are more effective than rereading or highlighting lecture notes). I provided materials for students to use so that they can implement these strategies at home in addition to the work done in class.

Anna - Chemistry

Anna Kornienko •Incorporating practice exam questions related to the lab experiments into lectures would provide opportunities for students to enhance their scientific communication abilities. As they work through these sample questions based on the labs, students can develop the vocabulary, style, and approach needed to successfully answer open-response items on exams. This practice will also reinforce students' comprehension of the core objectives and targets of each lab experiment.

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Facts: Diversity, Equity, Accessibility & Inclusion*

- Poor preparation that requires remedial education, usually in Math or English.
- The Hechinger Report has found that at least half a million students a year are placed into remedial courses and many of them give up in frustration, according to the advocacy organization Complete College America.

Students in Remedial Classes at Four-Year Institutions



* CollegeBoard AP Precalculus Symposium, Nov 2022

https://hechingerreport.org/more-high-school-grads-than-ever-are-going-to-college-but-1-in-5-will-quit/

Facts: Diversity, Equity, Accessibility & Inclusion*

The Very Wide Racial Gap in College Graduation Rates



Six Year Graduation Rates (2015-2021)

https://www.jbhe.com/2022/11/the-very-wide-racial-gap-in-college-graduation-rates/

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Key Takeaways: Please retrieve your key takeaways





Key Takeaways

• We hope our work will serve as a driving force to promote interdisciplinary discourse and increased awareness in an area that needs multifaceted approaches to a core issue of our time, namely the ongoing STEM recruitment and retention challenges, as it relates to student success and faculty collaborations.

Acknowledgements

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- Spring 2023 RR2PG Semester Support Group Participants:
 - Laurent Vera, Lyra Stein, Anna Kornienko.



Thank You

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